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|  <p>Pollution Prevention Case Study</p> | <p style="text-align: center;">Fort McCoy</p> <p style="text-align: center;">A Comprehensive Environmental Management Program to Minimize and Prevent Waste.</p> |
| <p>Standard Industrial Classification (SIC)</p> | <p>Military Base</p> |
| <p>Type of Waste</p> | <p>Air emissions, wastewater, hazardous waste, solid waste</p> |
| <p>Strategy</p> | <p>Comprehensive environmental management program</p> |
| <p>Company Background</p> | <p>Fort McCoy was established in 1909 and presently has approximately 2,200 civilian employees and 300 active military personnel. Fort McCoy provides training for active and reserve military units. Fort McCoy's Directorate of Public Works (DPW) is the organization responsible for ensuring that all installation activities related to operations, training and construction comply with all applicable federal, state and local environmental and cultural resource laws and regulations. The DPW Environmental and Natural Resources Division (ENRD) coordinates and executes programs for Fort McCoy, and supports U.S. Army Reserve Centers located in Wisconsin, Minnesota, Michigan, Illinois, northern Indiana and Ohio.</p> |
| <p>Motivation</p> | <p>The initial focus was regulatory compliance which evolved into exploration of alternative processes to meet budgetary challenges.</p> |
| <p>Pollution Prevention Process</p> | <p>Fort McCoy developed a comprehensive environmental management program to achieve significant reductions in hazardous waste, air emissions, wastewater and solid waste by implementing recycling programs, material substitutions, source reduction and process modifications.</p> <p>Hazardous Waste</p> <ul style="list-style-type: none"> • Paint Removal System Replaced a sand-blasting paint removal system with an aluminum oxide pellet-blasting system in 1993. The metal pellets can be reused up to 15 times before being sent off-site for treatment and disposal as solid waste. The sand from the old system could not be reused and was considered hazardous waste because of the presence of heavy metals from the paints. The old system generated about 12 tons a week of hazardous waste as opposed to only one ton a week of hazardous waste with the new system. <p>Air Emissions</p> <ul style="list-style-type: none"> • Gas Furnace Conversion Fort McCoy replaced between 3,000 and 4,000 coal-fired boilers with natural gas or liquid propane fuel furnaces between the years 1989 and 1995. This eliminated the use of 6,500 tons of coal per |

year. Subsequent reductions in emissions are summarized below.

| Emission | 1990* | 1994* | 1995 | Average Percent Reduction |
|-------------------------------------|--------------|--------------|-------------|--|
| Sulfur dioxide | 97 | 5 | 1 | 97% |
| Particulates | 61 | 5 | 3 | 93% |
| Nitrogen oxides | 23 | 2 | 13 | 67% |
| Carbon monoxide | 147 | 3 | 4 | 98% |
| Inhalable particulate matter | 12 | 3 | 3 | 75% |
| Reactive organic gas | 18 | 0.5 | 11 | 67% |
| * values are expressed in tons/year | | | | |

- **HVLP Paint Guns**
Fort McCoy installed High Volume/Low Pressure (HVLP) paint guns that reduce overspray and Volatile Organic Compound (VOC) emissions by approximately 50 percent, or 8,750 pounds per year. This resulted in lower material costs, less solvent usage and fewer changes of paint booth filters.

Wastewater

- **New Vehicle Wash Facility**
Fort McCoy uses more than five million gallons of water per year to wash vehicles. Previously Fort McCoy discharged all of this water to its wastewater treatment plant, but has recently completed a new wash facility that reuses about 98 percent of the wash water. The wash water is collected, sent to settling basins, filtered and then reused. This process reduces loadings to the wastewater treatment plant and conserves water.

Solid Waste

- **Land Application of Sludge**
Fort McCoy began land-applying its wastewater treatment sludge to areas of the base undergoing revegetation work. Prior to this, the sludge had been disposed of at a solid waste landfill. To date, 466 tons of sludge has been land-applied. This has reduced landfill costs and extended the life of the landfill, while benefiting from a valuable soil conditioner.
- **Metal Recycling Program**
Fort McCoy has established a metal recycling program for PCB-containing and non-PCB electrical transformers. Fort McCoy sends the PCB-containing equipment off-site where the fluid is drained and the casing is decontaminated. The oil is incinerated and the

| | <p>cleaned metal is then recycled. The non-PCB equipment can be directly recycled. The project has recycled approximately 100,000 pounds of valuable metals.</p> <ul style="list-style-type: none">• Motor Oil Absorbent Management Fort McCoy had previously disposed of its clay based absorbent after each use. This material subsequently would be shipped off-site for landfill disposal. Since 1991, motor oil absorbent is reused on-site until the absorbent is fully saturated. The absorbent is then treated on-site in bio-piles. If significant reductions do not occur on-site, the material is shipped off-site for further biodegradation prior to thin spreading. This management strategy had reduced the total amount of absorbent used on-site therefore reducing the volume of material for treatment.• Recycling Motor Coolants In 1996, Fort McCoy began recycling its motor coolants (anti-freeze). The coolants are collected and outside recycling vendor processes the recovered anti-freeze for reuse at the Fort. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|----------------------------|----------------|----------------------------|---------------|-----------------------|----------------|---------------------|---------------|------|---------------|---------------|-------|-----------------------|---------|---|---------|-------|---|----------|----------|-----------|---|----------|----------|-------------------------------|--|-------|---------|--|--|--|--|---------------------------------|-------------------|
| Economics | <ul style="list-style-type: none">• Paint Removal System<table><tr><td>Disposal Cost (old method)</td><td>\$237,120/year</td></tr><tr><td>Disposal Cost (new method)</td><td>\$19,750/year</td></tr><tr><td>Disposal Cost Savings</td><td>\$217,370/year</td></tr></table>• High Volume/Low Pressure Paint Guns (HVLP)<table><tr><td>Approximate savings</td><td>\$30,000/year</td></tr></table>• Land Application of Sludge<table><tr><th>Type</th><th>Old Process *</th><th>New Process *</th><th>Costs</th></tr><tr><td>Landfill tipping fees</td><td>\$44.00</td><td>0</td><td>\$44.00</td></tr><tr><td>Labor</td><td>0</td><td>(\$7.50)</td><td>(\$7.50)</td></tr><tr><td>Equipment</td><td>0</td><td>(\$7.00)</td><td>(\$7.00)</td></tr><tr><td colspan="2">*values are expressed per ton</td><td>Total</td><td>\$29.50</td></tr><tr><td colspan="4">Cost Savings = 466 tons at \$29.50/ton or \$13,750 (to date)</td></tr></table>• Metal Recycling Program<table><tr><td>Estimated Disposal Cost Savings</td><td>\$75,000, to date</td></tr></table> | Disposal Cost (old method) | \$237,120/year | Disposal Cost (new method) | \$19,750/year | Disposal Cost Savings | \$217,370/year | Approximate savings | \$30,000/year | Type | Old Process * | New Process * | Costs | Landfill tipping fees | \$44.00 | 0 | \$44.00 | Labor | 0 | (\$7.50) | (\$7.50) | Equipment | 0 | (\$7.00) | (\$7.00) | *values are expressed per ton | | Total | \$29.50 | Cost Savings = 466 tons at \$29.50/ton or \$13,750 (to date) | | | | Estimated Disposal Cost Savings | \$75,000, to date |
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| Type | Old Process * | New Process * | Costs | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Landfill tipping fees | \$44.00 | 0 | \$44.00 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Labor | 0 | (\$7.50) | (\$7.50) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Equipment | 0 | (\$7.00) | (\$7.00) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | <ul style="list-style-type: none">• Recycled Motor Oil Absorbent <table><tr><td>Approximate Savings</td><td>\$17,850/year</td></tr></table> <ul style="list-style-type: none">• Recycling Motor Coolants <table><tr><th>Type</th><th>Old Process</th><th>New Process</th><th>Costs</th></tr><tr><td>Product</td><td>\$5.50</td><td>0</td><td>\$5.50</td></tr><tr><td>Disposal</td><td>\$6.50</td><td>0</td><td>\$6.50</td></tr><tr><td>Recycle</td><td>0</td><td>\$2.00</td><td>(\$2.00)</td></tr><tr><td colspan="2">* values are expressed per gallon</td><td>Total</td><td>\$10.00</td></tr><tr><td colspan="4">Cost savings = 315 gallons at \$10/gal or \$3,150 (to date)</td></tr></table> | Approximate Savings | \$17,850/year | Type | Old Process | New Process | Costs | Product | \$5.50 | 0 | \$5.50 | Disposal | \$6.50 | 0 | \$6.50 | Recycle | 0 | \$2.00 | (\$2.00) | * values are expressed per gallon | | Total | \$10.00 | Cost savings = 315 gallons at \$10/gal or \$3,150 (to date) | | | |
|---|--|---------------------|---------------|------|-------------|-------------|-------|---------|--------|---|--------|----------|--------|---|--------|---------|---|--------|----------|-----------------------------------|--|-------|---------|---|--|--|--|
| Approximate Savings | \$17,850/year | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type | Old Process | New Process | Costs | | | | | | | | | | | | | | | | | | | | | | | | |
| Product | \$5.50 | 0 | \$5.50 | | | | | | | | | | | | | | | | | | | | | | | | |
| Disposal | \$6.50 | 0 | \$6.50 | | | | | | | | | | | | | | | | | | | | | | | | |
| Recycle | 0 | \$2.00 | (\$2.00) | | | | | | | | | | | | | | | | | | | | | | | | |
| * values are expressed per gallon | | Total | \$10.00 | | | | | | | | | | | | | | | | | | | | | | | | |
| Cost savings = 315 gallons at \$10/gal or \$3,150 (to date) | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>In Development</i> | <ul style="list-style-type: none">• Biodegradation of Petroleum-contaminated Soil In 1995, Fort McCoy began experimenting with the use of naturally-occurring bacteria to biodegrade petroleum contamination in soil. The process involves mixing contaminated soil, wood chips (which serve as a bulking agent) and a nutrient source. This material is placed outdoors in covered rows and oxygen is supplied via perforated piping. The experiment is not yet complete and will require further adjustments to the moisture and oxygen content. If the project is able to remove sufficient petroleum contamination, Fort McCoy estimates that treatment through this method will cost \$20 to \$25 per ton, versus \$50 per ton for asphalt incorporation.• Ultraviolet Disinfection Currently, Fort McCoy uses chlorine to disinfect its wastewater. By early 1997, Fort McCoy will replace this system with one that uses ultraviolet light. The new system will eliminate an estimated 1,200 pounds per year of chlorine discharges to the environment. By changing this process, Fort McCoy eliminates Tier II (EPCRA) reporting requirement and saves on the procurement of chlorine and sulfur dioxide. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>Benefits</i> | This comprehensive environmental management program has resulted in overall cost savings, reduced volume of wastes to landfills, reduced worker exposure to hazardous chemicals, reduced fire hazards and lowered pollutant-loadings to the environment. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <i>Other Environmental Programs</i> | Fort McCoy hosted the DNR's one-day Vehicle Maintenance Industry Pollution Prevention Workshop, providing facilities and advertising for the event. Over 150 people attended from the general public, state government and Army. Topics included a regulatory update and ideas for recycling and waste minimization programs for the vehicle maintenance industry. In 1989, Fort McCoy tested 94 of its approximately 1,800 buildings for radon. All of the tests found levels of radon far below the EPA standard. | | | | | | | | | | | | | | | | | | | | | | | | | | |

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| | Fort McCoy sponsored a hazardous waste clean sweep within the base in the summer of 1995, gathering 7,921 pounds of hazardous materials (paints, solvents, batteries, and acids). |
| Company Address | Commander Headquarters Fort McCoy 100 E. Headquarters Road Fort McCoy, Wisconsin 54656-5263 |
| Contact Person | Steven Stokke, Environmental Protection Specialist 608/388-4790 |
| Pollution Prevention Resources | <p>Free, On-site Technical Assistance University of Wisconsin Extension Solid and Hazardous Waste Education Center Milwaukee area: 414/475-2845 Remainder of state: 608/262-0385</p> <p>Pollution Prevention Information Clearinghouse Wisconsin Department of Natural Resources Cooperative Environmental Assistance 608/267-9700 or e-mail: cea@dnr.state.wi.us</p> |
| <div data-bbox="190 850 638 1159" data-label="Image"> </div> <div data-bbox="729 915 1421 1096" data-label="Text"> <p>Bureau of Cooperative Environmental Assistance Wisconsin Department of Natural Resources P.O. Box 7921 Madison, WI 53707 608/267-9700</p> </div> <div data-bbox="1318 1134 1459 1165" data-label="Text"> <p>TS-061 96</p> </div> | |